

Spot Safety Project Evaluation

Project Log # 200408182

Spot Safety Project # 03-97-401

**Spot Safety Project Evaluation, of the Flashing Traffic Signal Actuation and
The Installation of Post Mounted “Vehicle Entering When Flashing” Signs,
At the Intersection of NC 11 and SR 1102-Charity Road, in Duplin County**

Documents Prepared By:

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Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
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Principal Investigator

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Traffic Safety Project Engineer

03/21/2005
Date

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 03-97-401 – The Intersection of NC 11 and SR 1102-Charity Road in Duplin County

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naive before and after analysis and an odds ratio comparison analysis has been completed to measure the effectiveness of the spot safety improvement. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasures chosen for the subject location were the actuation of the existing standard flashing traffic signal and the installation of post mounted “Vehicles Entering When Flashing” signs on NC 11. The improvements were originally requested through the 1996 Safety Program. Both NC 11 and SR 1102-Charity Road have a posted speed limit of 55 mph and are two-lane facilities at the intersection. SR 1102-Charity Road is controlled by dually erected stop signs at the intersection with NC 11. A gas station/ convenience store is located in the southwest quadrant, a church is located in the southeast quadrant, and a private residence is located in the northeast quadrant of the intersection.

A pattern of motorists on SR 1102-Charity Road entering the path of vehicles on NC 11 developed, causing Angle type crashes. Sight distance is limited from the SR 1102-Charity Road approach due to the gas station/ convenience in the southwest quadrant and poles and large trees in the yard of the private residence located in the northeast quadrant. The initial crash analysis for this location was completed from January 1, 1993 through December 31, 1995 with a total of 20 reported crashes. There was 17 Angle Crash, one Left-Turn Crash, one Backing Crash, and one Other Collision With Vehicle Crash. Two class A, four class B, and 18 class C injuries resulted. The final completion date for the improvement at the subject intersection was on January 29, 1998.

Comparison Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from December 1, 1997 through March 31, 1998. The before period consisted of reported crashes from April 1, 1994 through November 30, 1997 (3 Years, 8 Months) and the after period consisted of

reported crashes from April 1, 1998 through November 30, 2001 (3 Years, 8 Months). The ending date for this analysis was determined by a signal head upgrade project in 2002, which revised the placement of the flashing traffic signal heads at the subject intersection.

The analysis also consisted of two different sets of data, the treatment and the comparison data. The treatment data consisted of all crashes within 150 feet of the subject intersection. The comparison data consisted of all crashes within a 150 feet Y-line on NC 11, from 150 feet south of SR 1188-Mangle Horne Road to 150 feet north of SR 2022-Friendly Lane. Please see attached *Location Map* for further detail. The following data table depicts the Naive Before and After Analysis for the treatment and comparison information. Please note that Angle Crashes were the target crashes for the applied countermeasure.

Treatment Information

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	23	3	- 87.0
Total Severity Index	15.07	8.40	- 44.3
Angle Crashes	19	3	- 84.2
Angle Severity Index	13.65	8.40	- 38.5
Volume	4400	4700	6.8

Comparison Information

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	33	51	54.5
Total Severity Index	3.02	8.83	192.4
Angle Crashes	1	9	800.0
Volume	2500	2500	0.0

Odds Ratio: Treatment versus Comparison

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Treatment Total Crashes	23	3	---
Comparison Total Crashes	33	51	- 91.6 %

The naive before and after analysis at the treatment location resulted in an 87.0 percent decrease in Total Crashes, a 44.3 percent decrease in the Total Severity Index, and a 6.8 percent increase in Average Daily Traffic (ADT). The comparison location resulted in a 54.5 percent increase in Total Crashes, a 192.4 percent increase in the Total Severity Index, and a 0.0 percent change in ADT. The before period ADT year was 1996 and the after period ADT year was 2000.

The Odds Ratio is used as another means of calculating the treatment effect. The total crashes in the before and after period from the Comparison Strip are used to calculate the percent reduction in total crashes for the Treatment Intersection. As shown in the table below, using the Odds Ratio calculation, there is a 91.6 percent decrease in Treatment Intersection crashes.

Results and Discussion

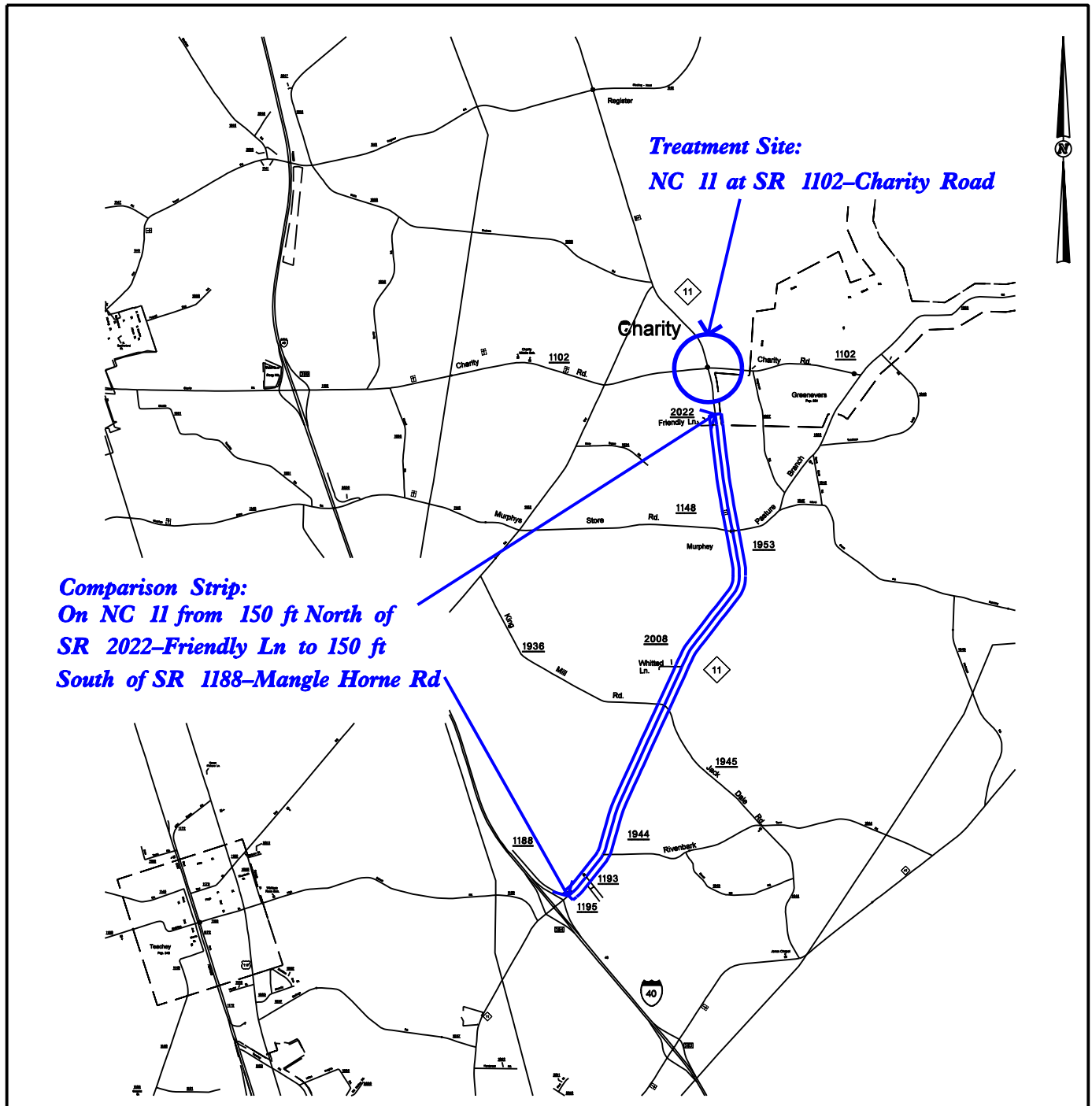
The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in an 87.0 percent decrease in Total Crashes and an 84.2 percent decrease in Angle Crashes. Using the Odds Ratio to calculate the treatment effect resulted in a 91.6 percent decrease in Total Crashes at the Treatment Intersection. The summary results above demonstrate that when using both analysis methods the treatment location appears to have had a decrease in the number of Total and Angle Crashes from the before to the after period.

Please see the attached *Treatment Site Location Photos*. Photos are provided for each leg of the treatment intersection. Also note the photo which shows the limited sight distance from the westbound SR 1102-Charity Road approach due poles and large trees in the yard of the private residence located in the northeast quadrant.

The countermeasure crash reduction for Total Crashes at the subject intersection can be in the range of an 87.0 percent decrease to a 91.6 percent decrease in crashes. The countermeasure crash reduction for Angle Crashes at the subject intersection is an 84.2 percent decrease in crashes. As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors.

Location Map, Duplin County

Evaluation of Spot Safety Project Number 03-97-401



Treatment Site Photo (Taken on December 15, 2004)



Looking north on NC 11



Looking south on NC 11

Treatment Site Photo (Taken on December 15, 2004)



Looking west on SR 1102-Charity Road



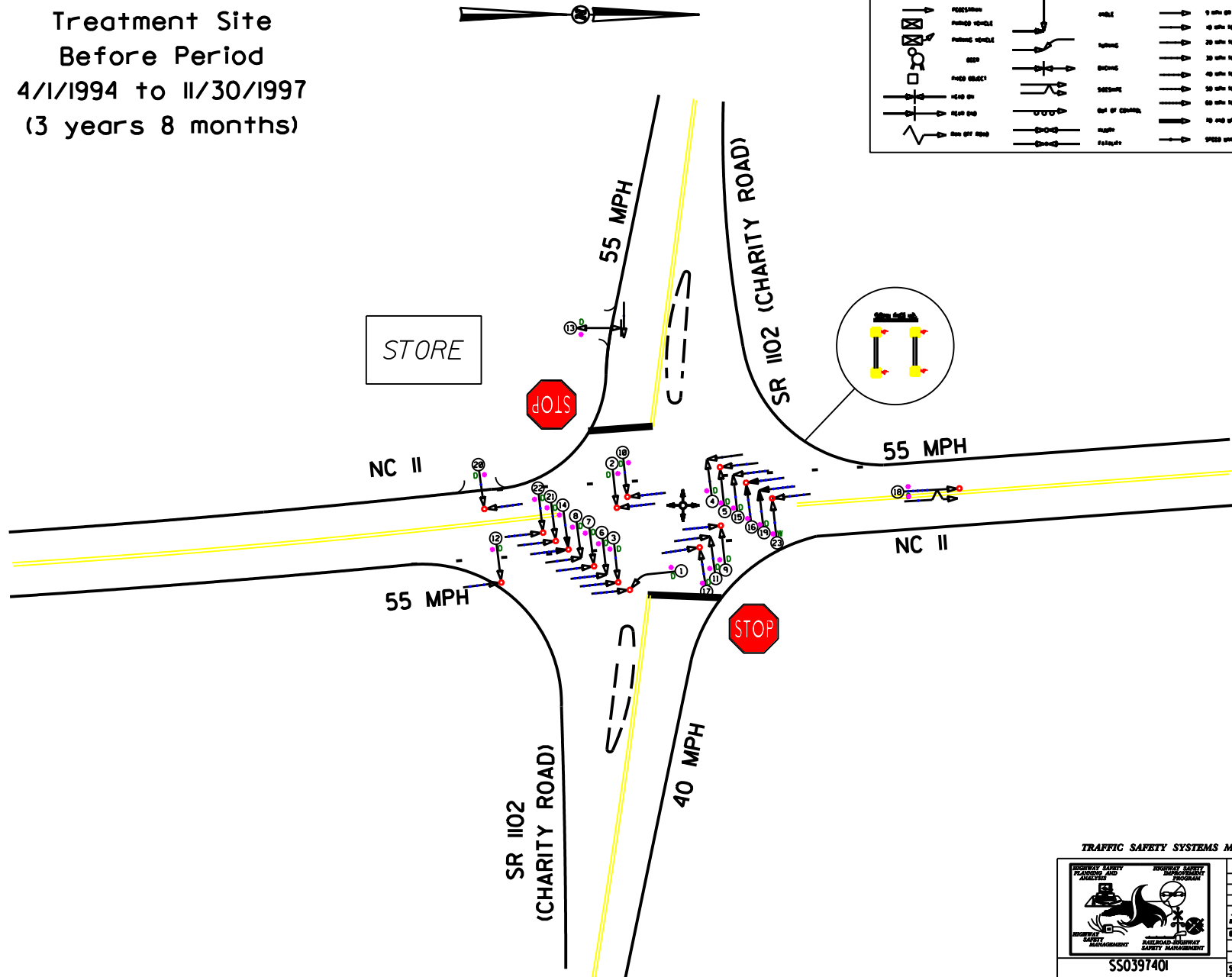
Looking east on SR 1102-Charity Road

Treatment Site Photo (Taken on December 15, 2004)



Looking north on NC 11, from westbound SR 1102-Charity Road
Notice poles and trees blocking the view of oncoming traffic.

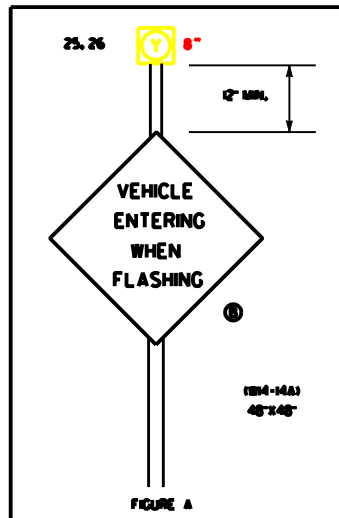
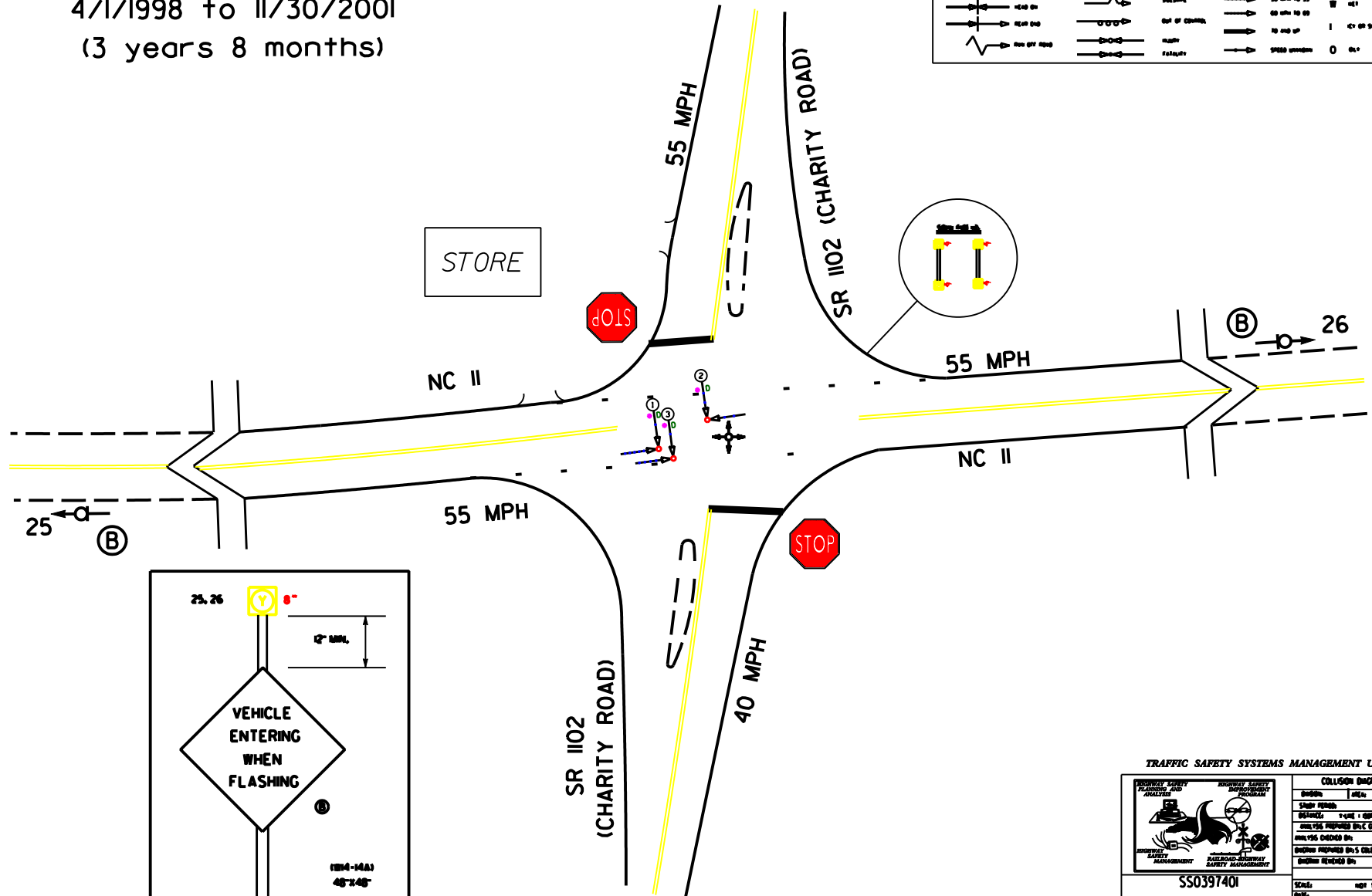
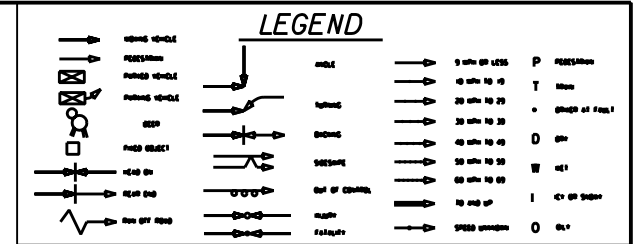
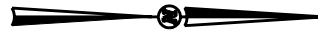
Treatment Site
Before Period
4/1/1994 to 11/30/1997
(3 years 8 months)



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	Project:	Area:
	Study Period:	Page: 1 of 1
	Diagram Prepared By: C. J. [Name]	Diagram Reviewed By: [Name]
SS0397401		Scale: Not to Scale
Before		Date: [Date]
N.C. DEPARTMENT of TRANSPORTATION DIVISION of HIGHWAYS TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH		

Treatment Site
After Period
4/1/1998 to 11/30/2001
(3 years 8 months)



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT																			
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